

REMARKS

The applicants respectfully submit that the Examiner's final rejection is based on an incorrect interpretation of the prior art cited. The present response is intended to be fully responsive to all points of final rejection raised by the Examiner, and is believed to place the application in condition for allowance. Furthermore, the applicants submit that since no amendments to the claims have been made, a further search should not be required. For these reasons, the applicants therefore respectfully request that this amendment be entered by the Examiner, and earnestly request favorable reconsideration and allowance of the application.

Claim rejections - 35 USC § 102

Claim 1, 2, 4, 6-12 and 18-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Singh et al., US 6,385,217.

The Examiner states that:

"Regarding claim 1, Singh teaches a wavelength locker system, comprising, an optical tap placed in the optical path of a laser (fig. 7 64), for splitting a laser signal into a tapped signal and a laser output signal, a free space tunable filter accepted the tapped signal and producing two signals that add to form a representation of the tapped signal (see fig. 7 element 70), a photodetector means (75 and 77) coupled to the tunable filter for capturing both signals output from the said tunable filter (66) and producing 2 electrical signals that represent the power intensity of each of said two output signals from the tunable filter, and a electronics unit (68) accepting the two electrical signals output from the photodetector and generating a feedback signal in response thereto.

Regarding claim 10, Singh teaches an optical tap (fig. 7 element 64) placed in the optical path of a laser transmitter for splitting a laser signal into a tapped signal and a laser output signal , a tunable filter (660 accepting the tapped signal and producing two electrical signals that add to form a representation of the tapped signal. The limitation of the filter tuned at an offset from a target lasing frequency at a point in which the two electrical signals output from the tunable filter to form a lock point pertains to a product by process limitation as adds no additional structure to the claim as the tuning point of tunable filter is by definition adjustable and tuning the filter one way rather

than another does not affect the overall structure of the device. Singh also teaches the feedback signal in response to the electrical signals output from the liquid crystal (see element 68)."

The applicants respectfully disagree with the Examiner's interpretation of what is shown in Singh et al., and in the conclusions drawn therefrom.

The Examiner asserts that the Singh reference "teaches a narrow band power splitter (filter) with tuning capabilities (see claim 4)", and also that Singh et al teaches a wavelength locker system comprising "a free space tunable filter(see fig. 7 element 70)". The applicants understand that the examiner is equating the power splitter shown in Singh et al with the free space tunable filter recited in claim 1 of the present application. The applicants disagree with this assertion for a number of reasons:

Firstly, in contrast to what is recited in claim 1 of the present application, the power splitter of Singh, as shown in Figs. 9 and 10, is a waveguided component, and not a free space component, as recited in claim 1 of the present application. The use of a free space component of the present invention significantly simplifies the construction of the wavelength locker, as compared with the fabricated optical waveguide splitter required in the device of Singh et al., thereby providing the presently claimed device with significant advantages.

Secondly, in contrast to what is recited in claim 1 of the present application, the cited element 70 in Fig. 7 of Singh et al is a power splitter and not a filter, and the applicants maintain that these components have different structure and function, and cannot therefore be regarded as equivalents in a claim recitation.

Furthermore, although the power splitter is claimed in claims 4 and 5 of Singh et al as being tunable, no enabling details whatsoever are given in the description of Singh et al, as to how this is to be achieved. There is a single phrase in col. 7, lines 36-37, in which it is stated that the waveguides could be active, made of, for example, Lithium Niobate", but nowhere is it disclosed in Singh how this would operate. Indeed, the present applicant's belief that Singh et al does not disclose an operable "tunable filter" is strengthened by the recitation in claim 4 of Singh et al, (cited by the Examiner as showing a filter with tuning capabilities) where there is claimed a device with passive waveguides for making the narrow band power splitter tunable. The applicants believe that

there is no way in which such a passive waveguide device can be made tunable, thus rendering claim 4 as meaningless, and illustrating that such a "tunable filter" is not disclosed in Singh et al.

Finally, in a number of locations in the specification, Singh et al discusses the so-called prior art methods of using a filter or etalon, and discards all of them as being disadvantageous in one respect or another. Thus, for instance, in col. 1, lines 25-32 of Singh et al, it is stated that:

"However, state of the art wave-lockers are constructed using **micro-optic filters or etalons** which add a significant cost and size to a laser diode device. In addition, such wave-lockers have high insertion loss which leads to a reduced signal-to-noise ratio due to the use of a prior optical tap in the system. Therefore, it is of significant advantage to construct an all-fiber device which is capable of limiting the wavelength drift in a laser diode without adding significant cost."(Emphasis added.)

Furthermore, in col. 2, line 60 to col. 3, line 4 of Singh et al, it is stated that:

"The **filter-based** wave-locker arrangement 20 has **two significant disadvantages**. First, since **the filter** 32 is wavelength selective, it can only be used at a specific International Telecommunication Union (ITU) recommended wavelength. For example, in a typical 50 GHz operation, in the 1550 nm window alone there are over 100 useable wavelengths, and **such a device would require fabrication of over 100 different filters** leading to cost and inventory issues."(Emphasis added.)

Additionally, in col. 3, lines 39-46 of Singh et al, it is stated that:

"Additionally, both of the wave-locker arrangements 20 and 40 require **a filter 32 or an etalon 42**, and a wide-band power splitter 30 **making the device footprint large and expensive**. Still further, while the wide-band power splitter 30 is reliable, a pig-tailing of the fourth terminal thereof, and **the use of a filter 32 or etalon 42, lead to lower reliability and a high cost** in addition to making the wave-locker arrangement 20 wavelength dependent."(Emphasis added.)

Finally, in col. 7, lines 52-63 of Singh et al, it is stated that:

"In summary, the advantages of the wave-locker arrangement 60 shown in FIG. 7 can be realized by noticing that **a filter-based device (shown in FIG. 3)** needs a wide-band power splitter 30, and **a wavelength dependent filter 32** which includes fiber pig-tailing the

filter 32 at the coupler 30. While such wide-band power splitter 30 is inexpensive and reliable, the **filter and pig-tailing lead to lower reliability and higher cost** in addition to making the device wavelength dependent. The **etalon-based wave-locker arrangement 40 (shown in FIG. 5)** is not wavelength specific, but still requires fabrication and fiber pig-tailing of a **Fabry-Perot etalon 42 which is expensive and has limited reliability.**"(Emphasis added.)

The applicants therefore assert that in all of these locations, Singh et al actually teaches away from the use of a filter (or an etalon), and cannot therefore be brought to show the use of a filter (or an etalon) to anticipate the claims of the present application.

The Examiner has also stated, in response to the applicants' previous response, that "Applicant has argued that the invention distinguishes over the prior art in that the applicant's device is a tunable filter wherein it maintains wavelength stability in response to temperature changes. However, the limitation of being a tunable filter does not necessarily imply any type of temperature insensitivity (which is not claimed)."

The applicants respectfully submit that this reading of their comments is incorrect. Nowhere in claim 1 do the applicants recite temperature stability. The applicants brought the example of overcoming temperature stability as one example of the use of the tunability of their wavelength locker in a particularly simple manner. In the same way, they could have used the examples that the tunability of the device of the present invention could also be used to lock the laser wavelength to compensate for changes arising from the aging of components, or from changes in atmospheric pressure, or from changes in the laser supply voltages, or any similar external influence which affects the laser wavelength, which, to the best of the applicants understanding, could not be so simply achieved by the Singh et al prior art device.

As a consequence of all of the above arguments, the applicants assert that nowhere, to the best of their understanding, is there shown or suggested in Singh et al., a **free-space tunable filter**, as recited in the claims of the present application.

The applicants therefore respectfully submit that none of claims 1, 2, 4, 6-12 and 18-20 as currently on file, are anticipated by Singh et al., and respectfully request withdrawal of the grounds for rejection of these claims under 35 U.S.C. 102(b).

Claims 3, 5 and 13-17 are variously dependent on either of claims 1 or 10, and recite further patentable material, and are therefore also deemed allowable.

Conclusion


The applicants respectfully submit that, in the light of all of the arguments mentioned above, all of the claims 1 to 20 are novel and unobvious over any combination of the prior art cited by the Examiner, and recite patentable material, and are therefore all deemed to be allowable.

Withdrawal of the finality of the rejection of this application, entry of this response, and reconsideration and prompt allowance of this application are therefore respectfully requested.

In the event the U.S. Patent and Trademark office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to Deposit Account No. 03-1952 referencing docket no. 595242000601.

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